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# Concurrent validity of the Wechsler Preschool and Primary Scale of Intelligence-Revised using the Kaufman Assessment Battery for Children and the Teacher Rating of Academic Performance scale with Puerto Rican kindergarten children.

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CONCURRENT VALIDITY OF THE WECHSLER PRESCHOOL AND PRIMARY  
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USING THE KAUFMAN ASSESSMENT BATTERY FOR CHILDREN AND  
THE TEACHER RATING OF ACADEMIC PERFORMANCE SCALE  
WITH PUERTO RICAN KINDERGARTEN CHILDREN

A Dissertation Presented

by

IVONNE ROMERO

Submitted to the Graduate School of the  
University of Massachusetts in partial fulfillment  
of the requirements for the degree of

DOCTOR OF EDUCATION

May 1989

Education

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by

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Dedication:

To Puerto Rican children . . .

whose voices must be heard.

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I wish to express my sincere gratitude to all the people that have made the culmination of my doctoral program and this research project possible. I would like to thank the members of my committee, Ena, Marla and Nilda, for their support, guidance, encouragement, and feedback throughout this process.

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## ABSTRACT

CONCURRENT VALIDITY OF THE WECHSLER PRESCHOOL AND PRIMARY  
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MAY 1989

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In view of the ongoing debate around the issue of bias in intelligence testing of minority populations and the continuing argument questioning the utility of these instruments in educational decision-making for minority students, it appears important to expand our knowledge on this topic so that we can contribute to the fair evaluation of the real needs and abilities of the minority preschool and kindergarten child. Therefore, the main purpose of this study is to assess the applicability of a standardization edition of the Wechsler Preschool and Primary Scale of Intelligence- Revised (WPPSI-R) with Puerto Rican kindergarten children by examining its concurrent validity using the Kaufman Assessment Battery for Children (K-ABC) as the criterion measure. In



addition, this researcher investigated the relationship between the Puerto Rican children's WPPSI-R scores and their current academic achievement, as measured by the Teacher Rating of Academic Performance (TRAP) scale.

The subjects in the present study were 30 fluent English-speaking, low SES Puerto Rican children enrolled in non-bilingual, regular education Kindergarten programs at an urban public school system in Western Massachusetts. There were 18 boys and 12 girls, ranging in age from 65 to 76 months, with a mean age of 71.1 months. The subjects were administered the WPPSI-R and the K-ABC in a counterbalanced order. In addition, the TRAP was given to all subject's teachers after formal testing had occurred. To test the research hypotheses, Pearson product-moment correlations and paired sample T-tests were performed.

Results of the statistical analyses indicated a high degree of relation between the WPPSI-R and the K-ABC. Of the fifteen correlations obtained between the two instruments, eleven were statistically significant. Similar results were found between the WPPSI-R and teachers judgements of students' achievement, as measured by the TRAP. Correlation coefficients of .54 ( $p < .01$ ); .41 ( $p < .05$ ); and .53 ( $p < .01$ ) were obtained between the total TRAP scores and the WPPSI-R Verbal, Performance and Full Scale scores, respectively.

Some evidence for the concurrent validity of the standardization edition of the WPPSI-R with a sample of Puerto Rican kindergarten children has been provided by the results of the present study. The findings are discussed in the context of research previously conducted and have implications for practice and future research.

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# CHAPTER I

## STATEMENT OF THE PROBLEM

The Wechsler Preschool and Primary Scale of Intelligence-Revised (WPPSI-R) is the updated version of the Wechsler Preschool and Primary Scale of Intelligence (WPPSI). The original instrument was developed in the United States during the Sixties to measure a 4 to 6.5 year old child's "intellectual capacity relative to children its own age" (Wechsler, 1967). The revised version of the WPPSI is currently undergoing national standardization in order to update its original norms and to extend the instrument's age range downward to age 3 and upward to age 7 (Psychological Corporation, 1987).

Although separate scales, the WPPSI and WPPSI-R continue with the basic methodological and theoretical principles used to construct the other Wechsler tests of intelligence. One of those basic principles is Wechsler's (1974a) notion on intelligence which he views as "the overall capacity of an individual to understand and cope with the world around him ... [it is] a multidetermined and multifaceted entity rather than an independent uniquely defined trait" (p. 31). He further suggests that intelligence tests measure "only a portion and not all of the capacities entering into intelligent behavior" (p.36). Thus, some of the aspects of "intelligent behavior" that intelligence tests measure are, to name a few, verbal



ability, abstract and arithmetical reasoning; abilities that are valued and needed for school success in the context of an industrialized society (Sattler, 1988).

According to Wechsler (1967), the WPPSI can systematically appraise a preschool child's abilities, which he believes are the same mental abilities that are encountered in later years. Since many of the subtests on the WPPSI and WPPSI-R are downward extensions of those in the Wechsler Intelligence Scale for Children (WISC) (Wechsler, 1949), it permits the comparison of the child's performance on the same abilities at a later age.

The original WPPSI was developed and published during 1967, a time in which the federal government had begun to play an increased role in preschool education. Although the evaluation of young children has its roots in the child development research efforts of Arnold Gesell in the early 1900s, it is not until 1965 with the Project Head Start that the evaluation of young children became a crucial and practical endeavor, surpassing a purely descriptive stage which characterized it previously (Kaufman, 1983). Now, it was necessary to have adequate instruments to assess young children's skills for the purpose of evaluating program effectiveness and program planning as well as for the continuation of funding. The funding was contingent on measurable gains exhibited through intelligence tests scores, achievement tests and other quantitative data

(Kelley & Surbeck, 1983). It is not surprising to observe that the WPPSI, as well as other early childhood assessment instruments came of age in the Sixties.

The passing of Public Law (P.L.) 94-142 in 1978, which required public school systems to provide appropriate education for special needs (handicapped) children between the ages of 3-21, expanded the need for appropriate assessment instruments and procedures. Since the schools responsibilities have been extended to include handicapped children between the ages of three and five, emphasis on early identification through: a) screening of potential "high risk" children and, b) psychoeducational diagnostic assessment of the child's level of functioning has become prevalent (Boehm & Sandberg, 1982). Based on this identification appropriate individualized educational programs are devised to help young children of preschool and kindergarten age benefit from special education services.

As can be seen, assessment of the preschool and early school age child "has assumed unquestioned importance during the past two decades" (Kaufman, 1983). In this process the WPPSI has been increasingly utilized in educational decision making. However, its use may present particular difficulties with minority children who might differ not only in language but in socio-cultural experience from the largely White groups used to norm this

test (Bergan & Parra, 1979). Unfortunately, the psychometric utility of the WPPSI and WPPSI-R in assessing the intelligence of ethnic minority populations has not been demonstrated. This is especially the case with Puerto Rican preschool and kindergarten children in the United States. Therefore, the main purpose of this study is to assess the applicability of the WPPSI-R with Puerto Rican kindergarten children by examining its concurrent validity using the Kaufman Assessment Battery for Children (K-ABC) as the criterion measure. In addition, this researcher will investigate the relationship between the Puerto Rican children's WPPSI-R IQ scores and their current academic achievement, as measured by the Teacher Rating of Academic Performance (TRAP) scale.

In view of the ongoing debate, since at least the 1920's (Reynolds, 1982), around the issue of bias in intelligence testing of minority populations and the continuing argument questioning the utility of these instruments in educational decision-making for minority students, it appears important to expand our knowledge on this topic so that we can contribute to the fair evaluation of the real needs and abilities of the minority preschool and kindergarten child.

In more than two decades since the WPPSI publication, no studies have been found investigating its psychometric properties and utility with Puerto Rican children. These

children are the second largest Latino<sup>1</sup> group after Mexican Americans (U.S. Bureau of the Census, 1983), and are at higher risk than White children to lag behind in education and drop-out from school (Walton, 1987). If the aim of practitioners utilizing the WPPSI is on gaining knowledge and understanding of these children so that ways can be found to help them develop their potentialities, great effort must be expended at the preschool and kindergarten level where early intervention can have long lasting impact on their development. It is hoped that this dissertation research will contribute to that endeavor.

---

<sup>1</sup>Latinos is a term used here to denominate persons of Spanish-speaking origin living in the United States. Latinos are a heterogeneous group composed of Mexican-Americans, Puerto Ricans, Cubans, and South and Central Americans.



## CHAPTER II

### REVIEW OF THE LITERATURE

This section involves a review of the investigations published on the WPPSI's psychometric properties with varied populations, with special interest in Latino children. Since the WPPSI-R is undergoing the process of standardization and no studies have yet been published, this review has focused on its parent instrument, the WPPSI. It presents information on the WPPSI's organization and standardization; its reliability, concurrent and predictive validity; as well as its factor structure. An effort has been made to integrate the findings of studies with diverse samples, for example, White, Black, Mexican-American, and Low SES. Before proceeding, it is important to clarify that in this review, all samples drawn from Head Start programs have been described as Low-SES. Although it is clear that those children must have come from families of low SES (in order to qualify for Head Start), the authors of the different studies in many cases failed to report Head Start childrens' ethnicity, presuming some homogeneity because of their participation in the program. Therefore, those studies are grouped here under low SES children, since that appears to be the common sampling thread between the investigations.

### Organization of the WPPSI

The WPPSI, published in 1967, contains eleven subtests, six Verbal and five Performance. Of those eleven subtests, eight (Information, Vocabulary, Arithmetic, Similarities, Comprehension, Picture Completion, Mazes and Block Design) were incorporated from the Wechsler Intelligence Scale for Children (WISC) and are currently found in the revised WISC (WISC-R) (Wechsler, 1974b). Three new subtests were specifically developed for the WPPSI (Sentences, Animal House and Geometric Design) which replaced four WISC tests (Digit Span, Picture Arrangement, Object Assembly and Coding).

Animal House resembles the Coding subtest of the WISC in that it requires the association of sign with symbol and represents a measure of learning ability. Memory, attention span, goal awareness and ability to concentrate are also involved in the Animal House subtest.

Geometric Design, according to Wechsler (1967), "was added to the WPPSI battery because previous studies indicated that the young child's ability to reproduce geometric figures correlates quite well with other measures of intelligence" (p.11). Of added importance is the fact that Geometric Design appears to be "relatively free of the limitations inherent in verbal tests" (p.11). Sentences is the other subtest unique to the WPPSI. It was intended as a replacement of the WISC Digit Span subtest.

Methods to compute WPPSI IQ's and evaluate scores are similar to those utilized in the WISC and WISC-R. The three IQ scores (Verbal, Performance and Full Scale) have a mean of 100 and a standard deviation of 15. Each subtest has a mean of 10 and a standard deviation of 3.

### Standardization Sample

The WPPSI was standardized on a sample of 100 boys and 100 girls in each of six age groups, ranging by half-years from 4 through 6.5 (N = 1200). They were selected through a stratified sampling plan using 1960 census data to insure representative proportions of various classes of individuals within the population. The variables used in the stratification of the sample were: age, sex, geographic region, urban-rural residence, color and, father's occupation (Wechsler, 1967).

The sample included White and non-White children, based on the ratios found in the 1960 census for each geographic region and for urban-rural residence. Overall, 86% of the sample was White and 14% non-White.

### Psychometric Properties

#### Reliability

Reliability coefficients reported in the WPPSI's manual were obtained using odd-even and split-half techniques with subjects from the standardization sample. For the Animal House subtest reliability was derived from



test-retest data since the other techniques are not appropriate for estimating reliability of speeded tests.

Table 2.1 summarizes the results of the WPPSI reliability studies. Reliabilities obtained with the standardization sample were high, ranging from .93 to .96 across each of the three WPPSI IQ's. On the other hand, reliabilities for the subtests were not as high. Average subtest reliabilities range from a low of .77 for Animal House to a high of .87 for Mazes (Sattler, 1988). These lowered reliability estimates were expected since fewer number of items are involved in computing subtest reliability coefficients.

Table 2.1  
WPPSI Reliability Coefficients for Varied Samples

Sample	Authors	N	Type of Reliability	WPPSI Reliability Coefficients		
				VS	PS	FS
Standardization	Wechsler, 1967	1,200	Split-half (odd-even)	.94	.93	.96
Standardization	Wechsler, 1967	50	Test-retest (Time Interval: 11 weeks)	.86	.88	.91
Black, Low SES	Croake, Keller & Catlin, 1973	38	Test-retest (Time Interval: 1 year)	NR	NR	.89
Mexican-American Low SES (LEP) <sup>a</sup>	Rankin & Henderson, 1969	50	Split-half (odd-even)	.95	.92	.95

NOTE: NR = Not Reported

<sup>a</sup>LEP = Limited English Proficient

Retesting, to assess the reliability of WPPSI test scores over time was done with a group of 50 children in the standardization group (Wechsler, 1967) and with a sample of 38 low SES Black preschool children (Croake, Keller & Catlin, 1973). In the standardization group study, children were retested at an average of 11 weeks after initial testing, and correlation coefficients were found to be at .86 (Verbal), .88 (Performance) and .91 (Full Scale). In the Croake, et al. study with Black children, WPPSI retesting was done over a one-year interval and a .89 coefficient of stability was found. In both studies higher mean IQ's, that might be attributed to practice effects, were found on the retest. Greater practice effects have been observed in the Performance Scale subtests.

A satisfactory split-half reliability coefficient of .95 for the total WPPSI score has also been reported with limited-English proficient Mexican-American children (Rankin & Henderson, 1969). Sex differences in reliability were found in the Rankin and Henderson study. Although reliability coefficients for the separate scales were not reported, according to Rankin and Henderson Mexican-American girls showed significantly lowered reliabilities in the Verbal scale, with Arithmetic and Similarities as the least reliable subtests. As can be seen in Table 2.1, the overall WPPSI appears highly reliable for this Mexican-

American sample, however, the IQ scores obtained in the Verbal (74), Performance (92) and Full (80) Scales were below the norm mean. It is possible that the administration of the WPPSI (apparently in English) to limited-English speaking children might have contributed to the depressed IQ scores, particularly evidenced in the verbal areas.

In summary, from the data presented previously it appears that the WPPSI has very good split-half reliability, particularly the IQ scales, for children in the standardization sample and for Mexican-American five year olders. Adequate WPPSI stability over time for Black, low SES children has also been demonstrated.

### Concurrent Validity

Minimal information is presented in the WPPSI manual about the validity of the scale (Sattler, 1988). However, studies done after the publication of the WPPSI are available and will be reported here. Most have compared the WPPSI with other intelligence tests, therefore they will be presented in subdivisions by criterion test utilized.

WPPSI and Stanford-Binet. Since most of the WPPSI concurrent validity studies found were done prior to the publication of the 1972 Stanford-Binet version, they utilized as the criterion measure the older 1960 Stanford-Binet (SB) norms.

As can be seen in Table 2.2 on the next page, those studies results yielded adequate concurrent validity coefficients for White, middle-class and low SES children, as well as for Black preschoolers. A mean correlation of .70 between the two scales was found for White, middle-class samples (Dokecki, Frede & Gautney, 1969; Kaufman, 1973a; Oakland, King, White & Eckman, 1971; Prosser & Crawford, 1971), while for low SES children, a mean correlation coefficient of .82 was obtained (Barclay & Yater, 1969; Fagan, Broughton, Allen, Clark, & Emerson, 1969; Pasewark, Rardin & Grice, 1971). For Black populations, correlations between the SB and WPPSI Full Scale ranged from .89 to .71 (Anthony, 1973; Fagan, et al., 1969).

For all samples, the WPPSI's Verbal scale, rather than the Performance scale, consistently yielded higher correlations with the SB. Also common to all the studies was the fact that the WPPSI yielded lower IQ's than the 1960 SB. By averaging IQ means reported by all the investigators, this author found average IQ differences between the two tests of 6 points for the Black samples, 4 points for the low SES samples and 8 points for the middle-class White samples.

The opposite pattern was exhibited in the performance of Black children on the 1972 version of the SB, where an IQ score 5 points lower than the WPPSI was obtained



(Sewell, 1977). Although no further studies were found comparing the IQ performance of White children on the WPPSI and 1972 SB, it appears plausible to suggest that for these children, as for their Black counterparts, the 1972 SB might also yield lower IQ scores than the WPPSI.

Table 2.2

Correlations Between WPPSI Scales and Stanford-Binet (SB)

Sample	Author	N	Correlation with WPPSI			Mean IQ's			SB IQ
			VS	PS	FS	VS	PS	FS	
White, High-SES	Dokecki, Frede & Gautney, 1969	40	.76	.55	.73	NR	NR	10 pts. lower than SB	NR
	Kaufman, 1973(a)	35	.66	.56	.70	106.8	105.2	106.6	115.6
	Oakland, et al., 1971	24	.74	.24	.56	NR	NR	4 pts. lower than SB	NR
	Prosser & Crawford, 1971	50	.84	.60	.82	101.0	108.7	105.1	112.6
Low-SES	Pasewark, Rardin, & Grice, 1971	72	.81	.73	.86	80.4	93.7	90.7	94.6
	Barclay & Yater, 1969	28=B 22=W	.73	.74	.81	91.7	96.3	93.3	100.9
	Fagan, et al., 1969	16=W	.79	.74	.80	87.6	90.5	87.9	98.1
Black, Low-SES	Anthony, 1973	20*	.86	.83	.89	76.1	72.2	72.2	77.0
	Fagan, et al., 1969	16	.94	.56	.82	88.3	86.6	86.2	92.3
	Oakland, et al., 1971	24	.59	.64	.74	80.0	84.5	80.3	83.2
Black <sup>a</sup>	Sewell, 1977	35	.75	.50	.71	98.8	94.3	94.1	91.3

NOTE: NR = Not Reported; B = Black; W = White  
 \* = Subjects selected from Teacher's referrals to Special Education  
<sup>a</sup> = Sample tested on 1972 version of the SB

WPPSI and WISC. Since these two Wechsler instruments overlap between the ages of six and six-and-a-half years, comparisons between them are important. Table 2.3 on page 14 summarizes the findings of WPPSI/WISC investigations.

The studies drawing on 24 White, middle-class subjects (Oakland, King, White & Eckman, 1971) and a stratified (on SES) random sample of 72 elementary school children in Milwaukee (Quereschi & McIntire, 1984), show that the WPPSI and WISC appear to be highly related. Although IQ score differences of 4 points or less between the two tests were reported, the direction of the difference varies across investigations. While Oakland et al. (1971) reports higher mean WPPSI than WISC Full Scale IQ's, Quereschi and McIntire (1984) report the opposite.

Table 2.3  
Correlations between WPPSI and WISC Scales

Sample	Authors	N	Correlation			MEAN IQ's			
			with WPPSI			WPPSI			WISC FS IQ
			VS	PS	FS	VS	PS	FS	
Stratified Random	Querechi & McIntire, 1984	72	.87	.76	.86	104.9	109.0	107.7	111.5
White, High- SES	Oakland, et al., 1971	24	.77	.82	.85	108.1	107.8	109.0	106.3
Low-SES	Crockett, Rardin & Pasewark, 1975	42	.41	.61	.54	85.4	92.0	87.5	94.4
	Wasik & Wasik, 1972	20	.67	.63	.76	85.6	92.5	82.5	92.7
Black	Oakland, et al, 1971	24	.57	.43	.65	80.0	84.5	80.3	84.1
	Wasik & Wasik, 1972	30	.67	.63	.76	87.3	80.5	82.3	93.1
	Yater, Boyd & Barclay, 1975	60	.77	.69	NR	93.0	94.3	93.0	88.3

Moderately high correlations were reported between the WPPSI and WISC Full Scales with low SES children (Crockett, Rardin & Pasewark, 1975; Wasik & Wasik, 1972). In this case, the WISC yielded higher Full Scale IQ scores than the WPPSI by an average of 8.6 points.

For Black, low SES children, correlations between the two tests suggest that the two tests are related to a moderate degree. As can be observed in Table 2.3, relatively small IQ differences between the WISC and the WPPSI were obtained for Black children.

WPPSI and WISC-R. With the revision of the WISC in 1974, studies centered around WPPSI/WISC-R comparisons since both scales overlapped between the ages of six to six-and-a-half years, and both could be used to evaluate children within that age range. However, no studies with Black or low SES White samples were found comparing these two scales

Table 2.4 on the next page, summarizes the results of three WPPSI/WISC-R correlational studies. One utilized 50 children selected through the same stratification plan used for the WISC-R standardization sample (Wechsler, 1974), another with 90 White, middle-class children (Rasbury, McCoy, & Perry, 1977). The last study used a stratified random sample of 72 Milwaukee elementary school children (Quereshi & McIntire, 1984). As shown, high correlation coefficients were found across the studies.



Table 2.4  
Correlations Between WPPSI and WISC-R Scales

Sample	Authors	N	Correlation with WPPSI			MEAN IQ's			
			VS	PS	FS	VS	WPPSI PS	FS	WISC-R FS
Stratified Random	Querechi & McIntire, 1984	72	.86	.77	.85	104.9	109.0	107.0	109.2
Standard-ization	Wechsler, 1974	50	.80	.80	.82	105.9	103.3	105.1	102.6
White, High-SES	Rasbury, et al., 1977	90	.81 <sup>a</sup>	.80 <sup>a</sup>	.94 <sup>a</sup>	118.9	116.0	119.3	114.5

NOTE: a = Correlations corrected for range restriction

WPPSI and McCarthy Scales. Data from the WPPSI/McCarthy Scales of Children's Abilities(MSCA) studies is presented in Table 2.5 on page 17. In a validity study reported in the MSCA Manual (McCarthy, 1972) with a sample of 35 White children from a parochial Catholic school, moderate correlation coefficients were found. The MSCA yielded lower IQ scores than the WPPSI, in this case by 2.3 points.

A substantial relation ( $r=.77$ ) between the WPPSI and the MSCA total scores has also been reported for English-dominant, low SES Mexican-American children (Valencia,& Rothwell, 1984). As with the White, higher SES subjects in the McCarthy study, the Mexican American children's mean scores in the WPPSI FS and MSCA GCI (General Cognitive Index) were found to be very similar. Although the WPPSI

FS scores appear 1.16 IQ points higher, this difference did not reach statistical significance.

Table 2.5  
Correlations Between WPPSI and McCarthy Scales (MSCA)

Sample	Authors	N	Correlations with WPPSI			Mean WPPSI IQ's			MSCA GCI
			VS	PS	FS	VS	PS	FS	
Matched-White	Arinoldo, 1981	10	NR	NR	NR	92.4	99.4	95.4	94.3
White, High-SES	McCarthy, 1972	35	.63	.62	.71	106.7	104.6	106.3	104.0
Black <sup>a</sup>	Arinoldo, 1981	10	NR	NR	NR	88.7	96.0	91.2	90.5
Mexican-American <sup>b</sup>	Valencia & Rothwell, 1984	39	.67 <sup>c</sup>	.78 <sup>c</sup>	.77 <sup>c</sup>	96.8	109.3	103.2	102.0

NOTE: NR = Not Reported; GCI = General Cognitive Index

<sup>a</sup> = Black samples are of Low SES

<sup>b</sup> = English-dominant, Low-SES sample

<sup>c</sup> = Corrected correlation coefficients due to range restriction

As seen in Table 2.5, Arinoldo (1981), in a study done with 10 Black and 10 matched White subjects did not report concurrent validity coefficients, however, this study was included since it offers IQ comparisons between the two instruments. As with higher SES Whites in the McCarthy (1972) study, and lower SES Mexican-Americans in the Valencia and Rothwell (1984) investigation, Arinoldo's matched Black and White children's mean WPPSI/MSCA scores were also found to be very similar.

WPPSI and K-ABC. Two studies with Black and Mexican-American samples were found comparing these instruments, and

both, contrary to the other investigations in this review, have included the WPPSI as the criterion test against which the Kaufman Assessment Battery for Children (K-ABC) was validated. However, they will be not only included in Table 2.6 on the next page, but discussed in detail, since they permit comparisons relevant to this writer's dissertation research.

According to Hartnett and Fellendorf (1983) and to Valencia (1984), comparisons between the three WPPSI IQ scores and five K-ABC Scaled scores for both low SES samples (Black and Mexican-American) indicate a restriction of range. This restriction was most outstanding for the Mexican-American sample in the highly verbally loaded scales (WPPSI Verbal & K-ABC Achievement). In view of the lower Verbal mean IQ and Achievement Standard Score performance for Mexican-American subjects, Valencia (1984) indicates the possibility that these children, although English-dominant, were experiencing some difficulties related to English language skills. Differential levels of use and exposure to English/Spanish language systems in the subjects homes and school environments might have contributed to those results.

On the next page (Table 2.6) we present the results from the K-ABC and WPPSI correlational studies with Black and Mexican-American samples.

Table 2.6

# Correlations Between WPPSI and K-ABC Global Scales for Black and Mexican-American Samples

Authors	Ethnicity	Sample		K-ABC Global Scales	Correlation with WPPSI								Mean K-ABC Scores	Mean WPPSI IQ's		
		SES	N		VS				PS					FS	VS	PS
					r	r <sup>c</sup>	r	r <sup>c</sup>	r	r <sup>c</sup>	r	r <sup>c</sup>				
Hartnett and Fellendorf, 1983	Black	NR	40	Sequential Processing	.37		.41		.46			93.0	94.9	98.5	96.1	
				Simultaneous Processing	.28		.50		.47			93.8				
				Mental Processing Composite	.37		.55		.44		.84	92.6				
				Achievement	.64		.47		.66			91.7				
				Nonverbal	.17		.44		.36			94.2				
Valencia, 1984	Mexican- American (E)	Low	42	Sequential Processing	.33	.65	.24	.41	.31	.58	100.1	95.7	109.2	102.4		
				Simultaneous Processing	.62	.65	.68	.73	.68	.76	106.5					
				Mental Processing Composite	.52	.72	.59	.65	.62	.76	104.1					
				Achievement	.52	.76	.52	.58	.58	.74	90.6					
				Nonverbal	.35	.67	.62	.64	.56	.72	106.9					

NOTE: NR = Not Reported; (E) = English-dominant

r = correlation coefficients

r<sup>c</sup> = correlation coefficients corrected for restriction of range

For both Black and Mexican-American samples, higher correlations were obtained between the WPPSI Verbal and K-ABC Achievement scales, suggesting the possibility that the two scales might be highly related. The Performance Scale of the WPPSI appeared related to the K-ABC Simultaneous and MPC Scales. When corrected for range restriction, correlations between the two overall instruments are adequate. However, caution must be exerted when interpreting these corrected correlations since they have been adjusted upward (Valencia, 1984).

WPPSI and Other Cognitive Tests. For low SES Black children, the relationship between the WPPSI and the Bender Gestalt, Coloured Progressive Matrices (CPM) and the Goodenough-Harris Drawing Test (GHDT) has been investigated and is presented in Table 2.7.

Correlations between the WPPSI and Bender were as high as .62, while for the CPM and GHDT they were of .30 (McNamara, Porterfield, & Miller, 1969) and .47 (Croake, Keller & Catlin, 1973), respectively.

WPPSI/GHDT comparisons have also been done with low-SES samples, and a correlation coefficient of .48 has been reported (Yater, Barclay & Leskosky, 1971). As can be seen in Table 2.7, the two studies done with the GHDT show that it yields IQ scores that are lower (low average range) than the WPPSI's (average range).



Table 2.7

**Correlations Between WPPSI and Other Cognitive Tests  
with Low-SES Samples**

Authors	Test <sup>a</sup>	N	Correlation with WPPSI			Mean IQ's			Criterion Test
			VS	PS	FS	WPPSI			
						VS	PS	FS	
Yater, Barclay & Leskosky, 1971	GHDT	48 [20=W 28=B]	.44	.42	.48	92.3	96.7	94.0	81.8
Croake, Keller & Catlin, 1973	GHDT	63=B	.57	.61	.47	99.5	101.5	100.0	77.5
McNamara, et al., 1969	CPM	42=B	.11	.38	.30	83.9	87.0	83.9	12.3 <sup>b</sup>
McNamara, et al., 1969	Bender	42=B	.47	.62	.62	83.9	87.0	83.9	16.6 <sup>b</sup>

NOTE: <sup>a</sup>GHDT = Goodenough-Harris Drawing Test; CPM = Coloured Progressive Matrices  
<sup>b</sup>Scores not converted to IQ's  
 B = Black; W = White

### Predictive Validity

Although data is available on the WPPSI's predictive validity with White, low and middle SES children, as well as with a Mexican-American sample, no single predictive validity study was found with Black children as subjects.

For White, middle-class children several studies have shown significant WPPSI's predictive validity coefficients (Adelman & Fuller, 1975; Kaufman, 1973a; Pasewark, Scherr & Sawyer, 1974; Plant & Southern, 1968; White & Jacobs, 1979). Following is Table 2.8 (modified from White and Jacobs, 1979) where the correlation coefficients for the WPPSI/Achievement studies are presented:

Table 2.8

**Correlations Between WPPSI and Reading Achievement Tests  
with White, Middle-Class Samples**

Study & Reading Test	N	Time	Correlation with WPPSI		
			VS	PS	FS
Plant & Southern (1968) SAT	52	18 mo.	.59**	.55**	.43**
Kaufman (1973a) MAT	35	4 mo.	---	---	.36*
Pasewark et al. (1974) MRR	30	1 yr.	.66*	.34*	.58*
Feshbach, et al. (1975) GMG	433	K & 1	.47**	.44**	.38**
White & Jacobs (1979) GORT	68	2 yrs.	.54**	.51**	.58**

NOTE: \* =  $p < .05$ ; \*\*  $p < .01$ ; SAT = Stanford Achievement; MAT = Metropolitan Achievement; MRR = Metropolitan Reading Readiness; GMG = Gates Mac Ginitie; GORT = Gray Oral Reading

With low SES children, the effectiveness of the WPPSI in predicting their first-grade reading achievement is adequate (Krebs, 1969). As can be seen in Table 2.9, the reading performance of first grade low-SES subjects in the Stanford Achievement (Reading) and the Gilmore Oral Reading Paragraphs Test was predicted with greater accuracy than that of the upper SES counterparts (Krebs, 1969).

For low SES third graders (Crockett, et al., 1976), the only significant correlations obtained were between the mathematical segments of the MAT and the WPPSI Performance IQ (.52) and Full Scale IQ (.43). The possible inclusion of limited English proficient children in the Crockett et al. study and the administration of the MAT three to four



years after WPPSI administration are two variables that might have had some extraneous effects on the study.

Finally, with low-SES, Mexican-American children, the efficacy of the WPPSI as a predictor of their third grade reading performance on the Metropolitan Reading Test (MRT) was not demonstrated (Henderson & Rankin, 1973). As with the Crockett, et al. study, questions related to the effects of: a) administration of the WPPSI (apparently in English) to limited English-proficient children in the sample, and, b) time interval of approximately four years between WPPSI and achievement testing, compounded with, c) lack of achievement data for the childrens' earlier grades; are left unanswered by these investigations.

Table 2.9

Correlations Between WPPSI and Achievement Tests  
with Low-SES Samples

Study & Achievement Test	Sample	N	Time	Correlation with WPPSI		
				VS	PS	FS
Crockett, Rardin & Pasewark (1976)	Low SES					
MAT:						
-Reading		35	3-4 years	.03	.23	.17
-Math		35	3-4 years	.24	.52**	.43**
Krebs (1969)						
SAT & GORP						
-Total Reading <sup>a</sup>	Low SES	35	1 year	.59**	.61**	.66*
Henderson and Rankin (1973)	Mexican- American, Low SES	36	3-4 years	--	--	.27
MRT						

NOTE: \* =  $p < .05$ ; \*\* =  $p < .01$  MRT = Metropolitan Reading Test

MAT = Metropolitan Achievement Test, SAT = Stanford Achievement; GORP = Gilmore Oral Reading Paragraphs

<sup>a</sup>Upper SES subjects in the Krebs (1969) study obtained correlation coefficients of .32, .35\*, .40\* for the Verbal, Performance and Full Scales respectively.

## Factor Analysis

The examination of the WPPSI's factor structure using the standardization sample as data source found two principal factors emerging: Verbal and Performance (Carlson & Reynolds, 1981; Hollenbeck & Kaufman, 1973; Kaufman, Daramola & DiCuio, 1977; Silverstein, 1969). These same two factors present in the WPPSI standardization group (Verbal and Performance) have also been found for Black (Kaufman & Hollenbeck, 1974) and low and higher SES White children (Heil, Barclay & Endres, 1978). No factor analytic studies have been done with Latino populations.

High loadings on the Verbal factor have been observed for the six Verbal subtests (Information, Vocabulary, Comprehension, Arithmetic, Similarities, and Sentences), however, the Arithmetic subtest also loaded substantially on the Performance factor (Kaufman, Daramola & DiCuio, 1977).

Encompassing the Performance factor were the five Performance subtests (Block Design, Mazes, Geometric Design, Picture Completion, and Animal House). However, Heil, Barclay and Endres (1978) found Picture Completion as an added factor for White, low and high SES samples, and Kaufman, Daramola and DiCuio (1977), found that Animal House and Picture Completion also had high loadings on the Verbal factor at ages four to four-and-a-half.

Although there are minor age-to-age fluctuations in the factor loadings, Sattler (1988) summarized that "the general trends noted [distinct Verbal and Performance factors/scales] can be applied to the various age levels covered by the scale" (p. 212).

#### Other WPPSI Studies

Two studies, summarized in Table 2.10 on page 28, have been found in the literature that have measured important variables other than WPPSI's reliability or validity with Latino children.

As shown in Table 2.10, Gerken (1978), investigated the relationship between three variables: a) "type of intelligence test (nonverbal with nonverbal directions, verbal with verbal directions and nonverbal with verbal directions)"; b) "examiner group ( bilingual Mexican American, bilingual Anglo and monolingual Anglo)"; and c) "language dominance of the children ( Spanish, bilingual, English) to the performance of Mexican American children on individually administered intelligence tests" (p.440).

The instruments utilized were: a) the Leiter International Performance Scale (LIPS) (Leiter, 1969), chosen as the nonverbal with nonverbal directions intelligence test and administered first to all children; b) the WPPSI, whose division into Verbal and Performance Scales make it appropriate as both the verbal with verbal

directions test, and as the nonverbal with verbal directions test; and c) the James Language Dominance Test (James, 1974), given to the children after the administration of the intelligence tests. Counterbalanced order of administration was not followed.

Gerken (1978) reports significant main effects for type of test and for language dominance. Relative to type of test, Mexican American (MA) children obtained significantly higher mean IQ scores on the LIPS (102.44) and WPPSI Performance Scale (98.96) than on the WPPSI Verbal Scale (78.40). In addition, the WPPSI's Verbal Scale scores were found to be significantly lower than WPPSI Full Scale scores (86.96).

In terms of language dominance variables, statistically significant differences between Spanish dominant group (Mean IQ scores of 80.30 in the WPPSI; 90.33 in the LIPS) and bilingual group (Mean IQ scores of 99.03 in the WPPSI; 109.23 in the LIPS) were found. The scores of the English dominant group, although not statistically significant, are higher than the scores of the other two groups (WPPSI Mean IQ score of 107.22; LIPS Mean IQ score of 109.33). Finally, no significant examiner's effect was found, contrary to the expectations.

Although Gerken (1978) attempted to control for linguistic background of children by measuring language dominance, it would have been interesting to also compare



the performance of the MA subjects who were Spanish dominant or bilingual on a Spanish translation of the WPPSI. It is not clear if Spanish dominant or bilingual children would have done better on the verbal test or on the nonverbal test with verbal directions if those tests were administered in the child's dominant language rather than in English. Perhaps those Spanish speaking children did so poorly not because of stronger nonverbal than verbal skills (the type of test: verbal vs. nonverbal) but because they could not understand accurately the instructions or information presented in English.

The last study that will be reviewed in this section was done by Bergan and Parra (1979) and is shown in Table 2.10 on the next page. They examined: a) the effects of variations in language of test administration (Spanish, English or both Spanish and English) on the WPPSI IQ performance and on academic skill learning and achievement of young bilingual Mexican American children, b) the WPPSI IQ performance of bilingual children tested in Spanish, English, or both English and Spanish; compared to the WPPSI IQ performance of Caucasian children tested in English, and c) the relationship between WPPSI IQ and academic learning under three instructional conditions of modeling, feedback, and modeling plus feedback.



Table 2.10

## Other WPPSI Studies with Latino Children

Sample			Procedures			Findings				
Authors	N	Sex	Ethnicity/ Language	SES	Instruments <sup>a</sup>	Variables	MEAN IQ's			Other Findings
							WPPSI FS	VS	PS	
Clark-Gerkin, 1978	25	M=14 F=11	MA (E, S & B)	NR (Head Start & Kinder- garten)	-LIPS -JLD	1. Type of test <sup>b</sup> ; NV/VS; V/V; NV/V 2. examiner's groups: MA(B) A(B) A (mono- lingual 3. children's language dominance	C <sup>c</sup> = 87.0 S = 80.3 B = 99.0 E = 107.2	78.4 62.3 83.7 103.7	99.0 88.2 104.1 108.7	No significant effect for examiner's groups, but significant effects for: 1. type of test (highest IQ scores on LIPS & WPPSI Performance than on WPPSI V & Full scale) and; 2. language dominance (of the three groups Spanish dominant children obtained the lowest IQ scores)
Bergan & Parra, 1979	96	M=41 F=51	MA(B)=72 A(E) =24	NR (feder- ally funded bi- lingual educa- tion pro- gram)	-WPPSI short-form (English and Spanish transla- tion) -Letter identifi- cation pre- and post-test	1. language of test administra- tion (English; Spanish; English & Spanish) 2. instruc- tional condition; (feedback; modeling; feedback & modeling)	77 86.3=MA 91.3=MA 97.5=A	=MA tested in English Spanish both English & Spanish English	NI tested in significantly lower than MA children tested in both English and Spanish, and A children. No significant IQ effects on letter pre- and post- test, or on instructional variations were found.	

NOTE: NR = Not reported; E = English dominant; S = Spanish dominant; B = Bilingual; MA = Mexican American; A = Anglo,  
N = Not Investigated  
<sup>a</sup>LIPS = Leiter International Performance; JLD = James Language Dominance Test  
<sup>b</sup>NV/NV = non-verbal with non-verbal directions; V/V = verbal with verbal directions; NV/V = non-verbal with verbal directions  
<sup>c</sup>C<sub>C</sub> = all language groups combined

Among the children, marked differences in their ability to comprehend and produce English and Spanish was reported by Bergan and Parra (1979). Unfortunately, no language dominance test was administered to insure objective identification and description of varying levels of language proficiency.

As the findings in the Bergan and Parra (1979) study suggest, language of test administration appears to be a crucial issue particularly affecting the WPPSI performance of limited English proficient MA children. They found that bilingual MA children given the WPPSI in English obtained lower Full Scale IQ scores (77) than MA children tested solely with a Spanish translation of the WPPSI (86.25), or than MA children tested in both English and Spanish (91.31) or than Anglo children tested in English (97.50).

Data supporting the importance of language of test administration in the WPPSI IQ performance of Mexican-American children is presented in Table 2.11. Of the four studies found with MA children, all of them administered the WPPSI in English to MA children with varying degrees of English language proficiency. It is clearly observed in those studies that while the mean WPPSI IQ scores of English-dominant MA children are within the average range (FSIQ's of 103.21 & 102.43), the Full Scale IQ scores of Spanish dominant or limited-English proficient children fall in the lower limits of the low average range (80 &

80.30). Bilingual MA children obtained WPPSI IQ scores that fell between the two IQ extremes, with a mean Full Scale IQ of 99.03.

Table 2.11  
WPPSI Reliability/Validity with Latino Children

Authors	Sample <sup>a</sup>		Procedures		Correlation with WPPSI			Findings			
	N	Ethnicity/ Language	Instruments <sup>b</sup>	Variables	Mean IQ's			FS	VS	PS	Test <sup>c</sup>
					FS	VS	PS				
Rankin & Henderson 1969	49	MA(LEP)	WPPSI	Split-half Reliability	.95	NR	NR	80	74	91	NI
Henderson & Rankin 1973	49	MA(LEP)	MRT (4 years after WPPSI)	Predictive Validity	.27	NR	NR	80	74	91	NI
Valencia & Rothwell 1984	39	MA(E)	MSCA	Concurrent Validity	.77	.67	.78	103.2	96.8	109.3	102
Valencia 1984	42	MA(E)	K-ABC	Concurrent Validity of K-ABC	.76	.72	.65	102.4	95.7	109.2	104

NOTE: NR = Not Reported; NI = Not Investigated

<sup>a</sup> All subjects in these studies are of Low-SES; MA = Mexican-American; LEP = Limited English Proficient; E = English Dominant

<sup>b</sup> MRT = Metropolitan Reading Test; MSCA = McCarthy Scales of Children's Abilities; K-ABC = Kaufman Assessment Battery for Children

<sup>c</sup> = Criterion Test

Finally, in all the studies with Mexican-American samples reviewed in this section WPPSI V < P discrepancies ranging from 20 to 5 IQ points are evidenced, with English-dominant MA children consistently obtaining the smallest V < P differences.

### Summary

Throughout this chapter the writer has intended to present a critical review of published research on the

WPPSI, focusing on its psychometric properties with different minority samples, particularly Mexican-American children. Although more work is still needed to arrive at any firm conclusions about the psychometric properties and applicability of the WPPSI with ethnic minority and low-SES children, some tentative assertions can be made and will follow.

### Psychometric Properties

It can be said, with the limited amount of data available, that some specific support for the WPPSI's split-half reliability with Mexican American and its stability over time with Black children has been provided.

At the present time, the predictive validity of the WPPSI with minority populations has not been substantiated. However, for low-SES children the WPPSI has been found to be effective in predicting their first-grade but not their third grade reading achievement scores.

Adequate WPPSI concurrent validity coefficients have been reported for low-SES, Black and Latino children when other cognitive tests like the SB, WISC, MSCA and K-ABC were used as criterion measures.

Finally, the WPPSI factor structure for low-SES, Black and White children appears similar. Clear Verbal and Performance factors have consistently emerged for those three populations.



### WPPSI IQ's, SES, and Language

Socioeconomic status or SES, has been demonstrated to have an important relationship with WPPSI IQ's. Children in the lowest SES groups, be they White or Black, tend to obtain similar and significantly lower IQ scores on the WPPSI.

With Latino children the variable of SES and its relationship to WPPSI IQ's has not been investigated, but other crucial variables have. Language dominance and language of test administration are variables that appear related to the WPPSI IQ scores of Mexican American children. On the one hand, mean WPPSI IQ scores of English-dominant Mexican American children are found within the average range, while the IQ scores of the Spanish-dominant or limited-English-proficient ones fall in the lower limits of the low average range.

When language of WPPSI administration varies, it was found that bilingual, Mexican American children tested in English obtained lower WPPSI IQ's than their counterparts tested with a Spanish translation of the WPPSI, or than those Mexican American children tested with both English and Spanish WPPSI versions. Anglo children tested in English obtained the highest IQ scores, followed by Mexican American children tested in both English and Spanish.

In conclusion, it appears plausible to suggest that if the variables of SES, English-language proficiency and



language of test administration are controlled for, race differences in WPPSI IQ scores might not be as significant, or evidenced at all.

### Implications for Dissertation Research

In more than two decades since the WPPSI's publication, only six studies have been found investigating its psychometric properties with Latino populations. All of the studies drew their samples from Mexican-American populations, thus, no studies were found with other Latino children, for example Puerto Ricans, which are the second largest Latino group after Mexican-Americans in the United States, and the subjects of interest for the proposed dissertation research.

Although Latino groups residing in the United States share a common heritage, language and in many cases similar social conditions, they are a heterogeneous population distinguishable from one another (see Appendix A for detailed information). Therefore, generalizations across the Latino groups, when necessary for the dissertation research, must be done with caution, taking into consideration that differences do exist.

With this in mind, and in view of the paucity of WPPSI research with Latino and especially with Puerto Rican populations, it is crucial to develop a broad base of psychometric data through further studies. However, the important issues and limitations that have surfaced across

the studies discussed in this section, must be taken into consideration.

A most important variable, such as language dominance/proficiency, has been left uncontrolled in many studies with Mexican American samples. Failure to: a) report the degree of language barrier present in the testing situation (Gerken, 1978), b) obtain language dominance measures and, c) control for varying levels of English language proficiency, are limitations that abound. It is unclear if the results obtained in some of the WPPSI studies reflect the Mexican American children's cognitive abilities or their command of the English language.

Other confounding variables present in the studies reviewed concern variations within the children such as: rural vs. urban, length of residency in the U.S., language spoken at home, SES, parents educational attainment and previous academic experiences; or variations across the testing situation such as: tester's language usage, as well as order of test administration when comparing the WPPSI with a criterion test.

Although not an easy task, further studies conducted with Latino populations need to exert more stringent control over the mentioned variables so that an accurate knowledge base is obtained with the WPPSI, ultimately benefiting those minority children tested with this instrument.

## CHAPTER III

### METHODOLOGY

This chapter describes this study's research methodology; including research design, hypotheses tested, population description, subject selection, instrumentation, data collection and analysis.

#### Design

This research is a correlational study and in order to test the hypotheses below, raw scores were obtained for the WPPSI-R Full, Verbal and Performance Scales and transformed into z-scores. Means and standard deviations were computed for the K-ABC Sequential, Simultaneous, Mental Processing Composite, Achievement and Nonverbal Scales. In addition, mean scores for each item of the TRAP scale were obtained.

#### Hypotheses

I. There is no relationship between the WPPSI-R Scale scores and the K-ABC Global Scale Standard scores of Puerto Rican kindergarten children.

II. There is no relationship between the WPPSI-R scores and the Teacher Rating of Academic Performance (TRAP) item scores of Puerto Rican kindergarten children.

III. There is no difference between the mean WPPSI-R Verbal and Performance scores of Puerto Rican kindergarten children.

IV. There is no difference between the means of the five K-ABC Global Scale Standard scores of Puerto Rican children.

#### Population

This study's sample was drawn from a population of Puerto Rican Kindergarten children at an urban public school system located in Western Massachusetts. This school system has a total of 630 Kindergarten students, out of which 360 (57%) are Latino, mostly Puerto Ricans. Of that total, 95 (26%) are in monolingual English regular education programs, with 79 of them falling in the low-SES category.

#### Sample

The subjects in the present study were 30 fluent English-speaking (FES), low-SES Puerto Rican children (18 boys and 12 girls) enrolled in non-bilingual regular education Kindergarten programs at an urban public school system in Western Massachusetts. Subjects' ranged in age from 65 to 76 months, with a mean age of 71.1 months. Parental consent (See Appendices B and C) and demographic data (i.e. parents' occupation, education, and language spoken at home) were obtained from brief questionnaires sent to parents and from school records (See Appendix D).



Only low-SES subjects were included in the present sample. Socioeconomic status determination was based on subject's participation in the Free-Lunch program (U.S. Department of Agriculture) at their schools. Program eligibility is based on family's reported income. In addition, reported parental educational attainment and occupation were utilized to confirm socioeconomic status.

Subject's language dominance was determined by :

a) Bilingual Syntax Measure (BSM) (Burt, Dulay, & Hernandez, 1975) proficiency levels obtained during Fall entrance administration; b) language used in kindergarten screening test administered by the school during Fall entrance; c) teacher judgement; d) examiner judgement prior to formal testing. Only children who obtained BSM Proficiency Levels (parallel English-Spanish administrations) equivalent to LAU Categories E (Monolingual speaker of English); D (Predominantly speaker of English); or C (Balanced Bilingual/Proficient English-speaking) were included. No children judged to be Spanish language dominant or Spanish monolingual were chosen since the WPPSI-R is intended for fluent, English speaking children. Test protocols were carefully reviewed to determine if language switching occurred.

From a total population of 79 low-SES Puerto Rican kindergarten students enrolled in monolingual English (non-bilingual) classes, 33 of them fulfilled all of the



criteria for subject selection (age range from 5-0 to 6-6 years; no special education referral; specific English language proficiency levels). Parental consent was obtained for all 33 subjects.

During the course of the investigation, one subject (female) was dropped after evidence of language switching was obtained by the examiner prior to formal testing. This girl was unable to respond consistently in English, would mix English and Spanish words within the same sentence, and frequently asked for clarifications in Spanish. A second subject (female) withdrew from school and returned to Puerto Rico before testing was completed.

### Instruments

A standardization edition of the WPPSI-R was used with the permission of The Psychological Corporation. The WPPSI-R is currently being standardized nationally, with a goal for data collection of 1,700 standardization cases based on 1980 Census information and 400 additional minority cases for bias analyses. The WPPSI-R represents an updated version of the original WPPSI, however, three main changes have occurred. First, the WPPSI-R age range has been extended downward to age 3 and upward to age 7. Second, Object Assembly has been added to the original 11 WPPSI subtests. Third, Animal Pegs will now be a supplementary test in the Performance scale. The WPPSI-R

will continue to yield Verbal, Performance and Full Scale IQ's with a mean of 100 and a standard deviation of 15, however, norms are not yet available.

Although no validity studies on the WPPSI-R have been published at the present time, its precursor, the WPPSI, has been shown to have adequate reliability and concurrent validity with Mexican-American children (Rankin & Henderson, 1969; Valencia & Rothwell, 1984; Valencia, 1984). The WPPSI's predictive validity with Mexican-American children and its psychometric properties with other Latino populations has yet to be demonstrated.

In order to determine the WPPSI-R's concurrent validity, the Kaufman Assessment Battery for Children (K-ABC) (Kaufman & Kaufman, 1983), a relatively new test of intelligence and achievement, was selected as the criterion measure. The K-ABC was normed on 2,000 children selected through a stratified sampling plan using the 1980 US Census. It is intended for children ages 2.5 to 12.5 years of age. The K-ABC consists of four Global Scales: Sequential Processing, Simultaneous Processing, Mental Processing Composite (Sequential plus Simultaneous), and, Achievement; each yielding standard scores with a mean of 100 and with a standard deviation of 15. It also includes a Nonverbal Scale composed of selected subtests from the Simultaneous and Sequential Scales. This special nonverbal scale, which according to Kaufman and Kaufman (1983) can be

administered in pantomime and responded to motorically, is intended to assess the intellectual functioning of children who are hearing impaired, speech-and-language disordered or non-English speaking.

The choice of the K-ABC over other measures was based on its: a) relatively new construction and normative data; b) inclusion of 27.5% minority children in the standardization sample, out of which 7.8% were Hispanic; c) "attempts to produce more sensitive assessment of black and Hispanic children" (Kaufman & Kaufman, 1983, p.15), and d) adequate reliability ( $r=.74$ ), stability ( $r^C=.77$ ), and concurrent validity using the WPPSI ( $r^C=.76$ ) and WISC-R ( $r=.63$ ) with Latino children (Hernandez & Willson, 1984; Valencia, 1985a; Valencia, 1984; Fourquarean, 1987). Moderate K-ABC predictive validity coefficients have also been obtained for Latino samples using the Peabody Individual Achievement Test ( $r^C=.65$ ) (Valencia, 1985b), Needs Assessment Survey-Reading and Math Scales ( $r=.61$ ), Teacher Assigned Grades ( $r=.50$ ) and the K-ABC Achievement scale ( $r=.74$ ) (Glutting, 1986).

To investigate the relationship between WPPSI-R scores and subject's current academic achievement, as measured by teacher's ratings, the Teacher Rating of Academic Performance (TRAP) (Gresham, Reschly, & Carey, 1987) scale was utilized.

The TRAP, as seen in Appendix E, is a five-item rating scale that requires the teacher to rate the student's academic achievement in the areas of overall classroom, reading and math performance. In items 1 to 3 the child's performance is to be compared with that of other children in his/her classroom (i.e., lowest 10% to highest 10%), while in items 4 and 5 the student's reading and mathematics performance is rated relative to grade-level expectations (i.e., well below grade level to well above grade level).

The TRAP was chosen due to its: a) briefness; b) prior utilization of Item 1 in a study with Mexican-American children where correlations of .43, .37 and .45 were obtained between TRAP (item 1) and WISC-R's V,P, and F IQ's, respectively (Partenio & Taylor, 1985); c) high index (.83) of internal consistency and adequate concurrent validity coefficients of .61, .52 and .61 with the WISC-R V,P and F IQ scores, respectively (Gresham, Reschly & Carey, 1987).

#### Data Collection and Analysis

The WPPSI-R and K-ABC were administered in a counterbalanced order by four (2 males, 2 females) bilingual school psychologists with extensive testing experience. All of the WPPSI-R's and half of the K-ABC were administered by one of the female examiners mentioned above. She is a Puerto Rican school psychologist who had



been authorized by The Psychological Corporation (TPC) to administer the WPPSI-R after completing an approved practice protocol, currently on file at TPC. Period of examination ranged from May to June 1988. All testing was done in quiet, secluded areas within the child's school. In addition, the TRAP was given to all subject's teachers after formal testing had occurred.

WPPSI-R raw scores were obtained for the subtests in each scale. The Sentences and Animal Pegs subtests, which are supplementary and not used to compute IQ scores, were deleted from the present analysis. Verbal, Performance and Full Scale raw scores were then transformed into z-scores (mean=0, SD=1.00). For the K-ABC, means and standard deviations were obtained for each of the Global Scales. To test Hypothesis I and II, Pearson product-moment correlations between the WPPSI-R and K-ABC standard scores, and between the WPPSI-R and TRAP item scores were performed. The Pearson product-moment correlations were chosen since the variables under investigation are continuous, and are not ranks but scores on an interval scale. To test Hypothesis III and IV, paired sample T-tests were performed. The Bonferroni correction was applied to the testing of Hypothesis IV in order to control for Type I error since multiple paired comparisons were performed.



## C H A P T E R   I V

### RESULTS

This chapter reports the results of the statistical analyses conducted for this study. The first section presents the variables involved in the present study. In the second section, results from correlations and T-test analyses, the principal tests of the research hypotheses, are presented and discussed. A final section describes additional analyses of the data.

#### Description of Variables

The variables in this study were as follow: three set of scores for the WPPSI-R (Verbal, Performance and Full Scale); five set of scores for the K-ABC (Simultaneous, Sequential, Mental Processing Composite, Achievement and, Nonverbal Scale); and Teacher Rating of Academic Performance (TRAP) scores for six items (Overall/Class, Reading/Class, Math/Class, Reading/Grade, Math/Grade, and Total Scale).

Since the WPPSI-R is currently undergoing national standardization and norms are not yet available, raw scores were utilized. The raw scores for each of the ten WPPSI-R subtests (five Verbal and five Performance) were transformed into z-scores by age group (five and six-year olders). This was done in order to obtain scores that would take into account possible differences in

maturational levels due to subject's age. After subtest z-scores were computed, they were added together under corresponding scale (Verbal or Performance) and a combined z-score was obtained. Finally, another z-score was computed for each scale, yielding a separate Verbal, Performance and Full scale z-score in which all subtests were equally weighted.

### Research Hypotheses

The research hypotheses of this study will now be presented and discussed based on the results obtained from statistical analyses.

#### Hypothesis I

There is no relationship between the WPPSI-R scale z-scores and the K-ABC Global scale standard scores of Puerto Rican kindergarten children.

Table 4.1 in the next page, presents the Pearson product-moment correlations computed between the WPPSI-R (Verbal:V, Performance:P, Full:F) and K-ABC (Sequential:SE, Simultaneous:SI, Mental Processing Composite:MPC, Achievement:AC, Nonverbal:NV) scales. As can be observed, a significant degree of relation was obtained between the WPPSI-R and most K-ABC Global Scales. However, there were some notable exceptions. Namely, the K-ABC Sequential Scale did not correlate significantly with the Verbal or Performance Scale of the WPPSI-R. In addition to the

Sequential Scale, the K-ABC Simultaneous and Mental Processing Composite (sum of Sequential and Simultaneous Scales) did not correlate with the WPPSI-R Verbal Scale.

Table 4.1  
Correlations Between the WPPSI-R and K-ABC Scales

K-ABC Standard Scores	WPPSI-R Z-Scores		
	V	P	F
Sequential	.3208	.3322	.3668*
Simultaneous	.2969	.6121***	.5105**
MPC	.3574	.5536**	.5117**
Achievement	.5827**	.4514*	.5805**
Nonverbal	.4009*	.6132***	.5695**

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

Close inspection of Table 4.1 reveals that the highest correlations were obtained between the WPPSI-R Verbal/K-ABC Achievement ( $r = .58$ ;  $p < .01$ ), between WPPSI-R Performance/K-ABC Simultaneous ( $r = .61$ ;  $p < .001$ ), and between the WPPSI-R Performance/K-ABC Nonverbal ( $r = .61$ ;  $p < .001$ ). The Full Scale of the WPPSI-R correlated significantly with all K-ABC Global Scales, especially with the Achievement Scale ( $r = .58$ ,  $p < .01$ ).

In view of the above results, Hypothesis I is rejected. There appears to be a significant relationship

between the WPPSI-R and most K-ABC Global Scales. As was mentioned earlier, some exceptions apply, since the K-ABC Sequential Scale does not seem to have an adequate degree of relationship with the WPPSI-R's Verbal or Performance Scales.

### Hypothesis II

There is no relationship between the WPPSI-R z-scores and the Teacher Rating of Academic Performance (TRAP) item scores of Puerto Rican kindergarten children.

In order to test hypothesis II, correlation coefficients were calculated between the WPPSI-R and TRAP scores. They are presented in Table 4.2. The first three Trap items compared the child's performance with that of other children in his/her class. In items 4 and 5 the student's reading and math performance was rated in relation to grade level expectations.

Examining the data presented in Table 4.2 on the next page, we can observe a substantially high relationship between the scores of the two instruments, and thus, hypothesis II is rejected. Although most of the correlation coefficients were of a significant magnitude, higher correlations ( $p < .01$ ) were obtained between the WPPSI-R Verbal and Full Scale scores and all TRAP item scores. Lower correlations ( $p < .05$ ) were obtained between the Performance Scale of the WPPSI-R and the TRAP. In fact, the only non-significant correlation was found between the



TRAP Overall/Class item (measures the overall academic performance of the student in relation to the other children in the classroom) and the WPPSI-R Performance Scale.

Table 4.2  
Correlations Between the WPPSI-R and TRAP Scores

TRAP Item Scores	WPPSI-R z-Scores		
	V	P	F
Overall/Class	.5147**	.3458	.4833**
Reading/Class	.5442**	.3868*	.5284**
Math/Class	.5603**	.3737*	.5246**
Reading/Grade	.4416*	.3989*	.4721**
Math/Grade	.5432**	.4312*	.5472**
TRAP Total	.5443**	.4079*	.5348**

\* $p < .05$ ; \*\* $p < .01$

### Hypothesis III

There is no difference between the mean WPPSI-R Verbal and Performance scores of Puerto Rican kindergarten children.

To test Hypothesis III, a paired t-test was performed on the WPPSI-R Verbal and Performance scores. For this sample, the Verbal and Performance scores of the WPPSI-R represent the percentage of correctly answered items in each scale. For the Verbal Scale there were 177 possible



points, and for the Performance Scale there were 135 possible points. Z-scores were not utilized for this comparison because the mean would have been 0. Table 4.3 presents the results from the paired t-test performed.

Table 4.3

Comparison of WPPSI-R Verbal and Performance Scale Scores

WPPSI-R Scale	Mean	SD	Dif. in Means	t
Verbal	57.11%	9.50		
Performance	80.93%	6.16	-23.81	-16.34***

\*\*\* $p < .001$

$t(29) = 2.045$ ,  $p < .05$

Based upon the results of the t-test presented in Table 4.3 there are highly significant differences between the mean WPPSI-R Verbal and Performance scores, in favor of the Performance. The probability that such a difference between the means would occur merely as a function of sampling error was very small ( $p < .000$ ). Therefore, Hypothesis III is rejected.

#### Hypothesis IV

There is no difference between the means of the five K-ABC Global Scale Standard scores of Puerto Rican kindergarten children.

To test this hypothesis, paired sample t-tests were performed. The Bonferroni correction was applied in order to control for Type I error since multiple paired comparisons were performed. Table 4.4 presents the results.

Table 4.4  
Comparison of K-ABC Global Scale Standard Scores

K-ABC Scales	$\bar{X}$	SD	T-scores for K-ABC Comparisons				
			SE	SI	MPC	AC	NV
SE	102.1	14.8	—	-.77	-1.13	3.91**	-.82
SI	104.1	11.4		—	.26	5.85***	.33
MPC	103.8	12.3			—	5.92***	0
AC	92.6	10.9				—	-6.06***
NV	103.8	10.6					—

\*p<.05; \*\*p<.01; \*\*\*p<.001  
t(29)= 2.045, p<.05

As can be seen in Table 4.4, t-tests revealed that the only significant mean differences were between the K-ABC Achievement Scale and the other four scales: Sequential, Simultaneous, Mental Processing Composite, and Nonverbal. The mean differences between the Achievement Scale and all the others ranged from 11 points (Achievement/Simultaneous, Mental Processing Composite and Nonverbal) to 9 points (Achievement/Sequential). Paired comparisons (excluding

Achievement Scale) between the remainder 4 scales did not yield any significant mean differences. Therefore, hypothesis IV is rejected since the results obtained indicate that there are significant differences between the K-ABC Achievement Scale and the remainder four K-ABC Scales. We can conclude that the children in the present study obtained significantly lower scores in the Achievement Scale than in the other K-ABC scales.

#### Additional Analyses of the Data

In order to determine if the variables of sex, LAU category (differing levels of English/Spanish proficiency) and parental occupation had a relationship with the children's scores on the WPPSI-R, additional analysis were performed.

Paired t-tests were performed using the variables of sex and LAU category. Table 4.5 presents the number of cases by LAU category.

Table 4.5

#### Number of Cases by LAU Category

LAU Category	Number of subjects
C (Balanced Bilingual)	17 (F=6; M=11)
D (English dominant)	3 (F=2; M=1)
E (English monolingual)	8 (F=3; M=5)
Not reported	2 (F=1; M=1)

In reviewing Table 4.5, one can observe that LAU category D only had 3 subjects, which is a very small number to be able to make meaningful comparisons. Therefore, LAU D and E were collapsed into one category for statistical analysis. Both LAU D and E groups are relatively comparable in that they have similar levels of oral English proficiency and have less oral Spanish proficiency than the balanced bilingual group (LAU C).

Although eight occupational categories were available (See Appendix D for description) the subjects in the current sample were clustered around three of them: Service (N=8); Operator/Laborer (N=6); Homemaker (N=13). The remainder subjects (N=3) fell in the last category: Not currently in the labor force.

One-way analysis of variance (ANOVA) procedures were performed on the three parental occupational groups mentioned above. The occupational group (Not currently in the labor force) was not incorporated into the ANOVA since its small number of subjects precluded meaningful comparisons.

As can be seen in the next pages (Tables 4.6 to 4.10), the results of the T-tests and ANOVA were essentially unremarkable. There were no significant differences between the mean WPPSI-R z-scores for boys and girls; for subjects in the LAU C vs. LAU D categories; or of subjects

whose parents were in one of the three occupational groups (service, operator/ laborer, homemaker).

Table 4.6

Comparisons of Female and Male Mean Z-Scores<sup>a</sup> on the WPPSI-R

Group	N	Mean Verbal z-scores	SD	t
Female	12	-.1803 (97.29)	.81	.8159
Male	18	.1202 (101.8)	1.08	
Mean Performance z-scores				
Female		-.1201 (98.19)	.90	.5398
Male		.0801 (101.2)	1.05	
Mean Full Scale z-scores				
Female		-.1682 ( 97.47)	.88	.760
Male		.1121 (101.68)	1.04	

<sup>a</sup> The z-scores in parenthesis have been transformed to a mean of 100, and a standard deviation of 15 for comparison purposes. However, they were not used for statistical analyses.

\*  $t(29) = 2.045$ ,  $p < .05$



Table 4.7

Comparisons of LAU C and LAU D Group Scores<sup>a</sup> on the WPPSI-R

Group	N	Mean Verbal z-scores		SD	t
LAU C	17	-.0668	(98.99)	1.06	.3349
LAU D/E	11	.0614	(100.92)	.85	
Mean Performance z-scores					
LAU C		-.0660	(99.01)	1.15	.6233
LAU D/E		.1780	(102.67)	.73	
Mean Full z-scores					
LAU C		-.0745	(98.88)	1.14	.5403
LAU D/E		.1345	(102.01)	.69	

<sup>a</sup> The z-scores in parenthesis have been transformed to a mean of 100, and a standard deviation of 15 for comparison purposes. However, they were not used for statistical analyses.

\*  $t(27) = 2.052$ ,  $p < .05$

Table 4.8

Analysis of Variance: WPPSI-R Verbal Z-scores by  
Occupational Group: Service, Operator/Laborer, Homemaker

Source	Sum of Squares	DF	Mean Squares	F	Prob. of F
Between Groups	.4292	2	.2146	.2072	.8143
Within Groups	24.8618	24	1.0359		
Total	25.2910	26			

Table 4.9

Analysis of Variance: WPPSI-R Performance Z-scores by  
Occupational Group: Service, Operator/Laborer, Homemaker

Source	Sum of Squares	DF	Mean Squares	F	Prob. of F
Between Groups	1.1086	2	.5543	.5439	.5874
Within Groups	24.4565	24	1.0190		
Total	25.5651	26			

Table 4.10

Analysis of Variance: WPPSI-R Full Z-scores by  
Occupational Group: Service, Operator/Laborer, Homemaker

Source	Sum of Squares	DF	Mean Squares	F	Prob. of F
Between Groups	.9178	2	.4589	.4589	.6374
Within Groups	23.9995	24	1.0000		
Total	24.9173	26	* $F_{.05} = 3.40$ , $p < .05$		

A breakdown of WPPSI-R z-scores by occupational groups is provided in Table 4.11 since that information was not included in the ANOVA tables located in the previous page.

Table 4.11

Distribution of WPPSI-R Mean Z-scores<sup>a</sup> by Occupational Group

WPPSI-R Scales	WPPSI-R z-scores by Occupational Groups <sup>b</sup>		
	Service	Operator	Homemaker
V	.2139 (103.2)	.2183 (103.3)	-.0365 (99.45)
P	.3139 (104.7)	.2446 (103.7)	-.1183 (98.22)
F	.2960 (104.4)	.2605 (103.9)	-.0873 (98.69)

<sup>a</sup> Z-scores in parentheses have been transformed to a mean of 100, and a standard deviation of 15 for comparison purposes.

<sup>b</sup> Service (N=8); Operator/Laborer (N=6); Homemaker (N=13).

## C H A P T E R    V

### DISCUSSION

In this chapter the overall results of the study are reported in response to the research hypotheses formulated at the outset of the investigation. Following is a general summary of the study that reviews its design and rationale. Findings are then compared with those of previous research. To conclude, implications and limitations of the current investigation as well as suggestions for future research are offered.

#### Rationale and Design

The purpose of this study was to assess the applicability of a standardization edition of the WPPSI-R with Puerto Rican kindergarten children by examining its concurrent validity using the K-ABC as the criterion measure. In addition, the relationship between the Puerto Rican children's WPPSI-R scores and their current academic achievement, as measured by the Teacher Rating of Academic Performance Scale (TRAP), was investigated.

The sample consisted of 30 fluent English speaking, low SES Puerto Rican children enrolled in non-bilingual regular education Kindergarten programs. Subjects ranged in age from 65 to 76 months, with a mean age of 71.1 months. All children were administered the WPPSI-R and the K-ABC in a counterbalanced order. In addition, teachers



were asked to complete an academic performance rating scale (TRAP) for each subject after formal testing had occurred. Examination of the relationship between the WPPSI-R and the K-ABC constituted the main focus of this study.

Correlation analyses were performed to determine if there was a relation between the WPPSI-R and K-ABC, and between the WPPSI-R and the TRAP. T-tests were performed to determine if there were significant differences between the mean Verbal and Performance Scale scores of the WPPSI-R, and between the K-ABC Global scale scores.

A unique contribution which this study made to the body of psychometric research was the use of the newly revised version of the WPPSI with Puerto Rican five and six year olders. To date, no studies are available with the WPPSI-R. But most importantly, in more than two decades since the WPPSI publication, no studies have been found investigating its psychometric properties with Puerto Rican children, which are the second largest Latino group in the United States.

### Results in Relation to Previous Research

Although no validity studies on the WPPSI-R are available at the present time, several studies have been carried out with its precursor, the WPPSI. They will be discussed in this section as they relate to the findings of the current research.

### WPPSI-R and K-ABC

In regard to the concurrent validity of the WPPSI-R with Puerto Rican children, which is our main research hypothesis, the degree of overlap with an established criterion of intelligence (the K-ABC) provides evidence for its concurrent validity. Of the fifteen correlations obtained between the two instruments, eleven were statistically significant.

Consistent with Hartnett and Fellendorf (1983) study with Black five-year olders and Valencia's (1984) investigation with English-dominant Mexican-Americans of the same age, this study also found high correlations between WPPSI-R Verbal/K-ABC Achievement (.58,  $p < .01$ ); WPPSI-R Performance/K-ABC Simultaneous (.61,  $p < .001$ ) and Nonverbal (.61,  $p < .001$ ) scales.

As expected, the K-ABC Achievement correlated much more highly with the WPPSI-R Verbal than Performance scales. This might be due to the linguistic, culture-loaded and school related features that characterize both Verbal and Achievement scales. Predictably then, the K-ABC Simultaneous and Nonverbal scales correlated more highly with the WPPSI-R Performance than with the Verbal due to the less verbally-loaded and visual-spatial nature shared by the Performance, Simultaneous and Nonverbal scales.

Lower and nonsignificant correlations were obtained between the K-ABC Sequential and WPPSI-R Verbal (.32),

Performance (.33), and Full (.37,  $p < .05$ ) scales. Hartnett and Fellendorf (1983) and Valencia (1984) found similar low correlations, respectively (V: .37, .33; P: .41, .24; F: .46, .31) for Black and Mexican-American five year old samples tested with the WPPSI.

These lower WPPSI-R/K-ABC Sequential correlations may be related to the lack of shared content between the two scales. While the K-ABC Sequential scale is heavily laden with short-term memory tasks (Hand Movements, Number Recall, Word Order), the WPPSI-R is not. For example, the WPPSI-R Verbal scale only has one subtest, Sentences, which primarily measures short-term auditory memory. The WPPSI-R Performance scale has Animal Pegs, which has some loadings in short-term visual memory. However, both WPPSI-R subtests are supplementary (not included in computing IQ scores) and were therefore deleted from the statistical analyses performed for the present study. This might have also contributed to underestimate the degree of relationship between the WPPSI-R/ K-ABC Sequential scales.

Finally, in this study there was a lack of significant relation between the WPPSI-R Verbal and K-ABC Mental Processing Composite (MPC). This was expected as the MPC is a combined score of the Sequential and Simultaneous scales, both of which did not correlate significantly with the WPPSI-R Verbal scale.

## WPPSI-R and TRAP

In the present study a significant degree of relationship was found between the WPPSI-R and teacher's judgements of students achievement, as measured by the TRAP. Correlation coefficients of .54 ( $p < .01$ ), .41 ( $p < .05$ ) and .53 ( $p < .01$ ) were obtained between the total item scores in the TRAP and the WPPSI-R Verbal, Performance and Full scale z-scores, respectively. These results are consistent with those obtained by Gresham, Reschly and Carey (1987) in their study comparing TRAP with WISC-R scores. They found significantly high correlations of .61 (Verbal), .52 (Performance), and .61 (Full).

Similar correlations have also been found by Partenio and Taylor (1985) between TRAP item 1 (measuring overall classroom performance compared to his/her peers) and the WPPSI or WISC-R (depending on subject's age) of Mexican-American children. They report correlations of .43, .37 and .45 for the Verbal, Performance and Full scales.

It is interesting to note that with both Partenio and Taylor, and Gresham, Reschly and Carey's (1987), as well as with our sample, the Performance scale produced lower correlations with teacher ratings than did the Verbal and Full scales. A possible explanations might be that the abilities tapped by the Performance scale (visual-motor, perceptual organization, nonverbal) are not highly



represented in the TRAP, and thus, the lower correlations evidenced.

#### WPPSI-R Verbal and Performance Scales

Previous research with the WPPSI (Clark-Gerken, 1978); Valencia, 1984; Valencia & Rothwell, 1984) has shown that English dominant Mexican-American four to five year olders obtain WPPSI Performance scores that are, on the average, 10 points higher than their WPPSI Verbal scores. These lower Verbal vs. Performance scores (5 point mean discrepancy) have also been reported for low-SES samples (Barclay & Yater, 1969; Fagan, et al., 1969; Pasewark, Rardin, & Grice, 1971).

The results of the present study provide research support for those previous findings. Puerto Rican (fluent English speakers) children in the current sample obtained a significantly higher percentage of correctly answered items in the Performance (81%) than in the Verbal (57%) Scale of the WPPSI-R. It appears that the WPPSI-R, in comparison to the WPPSI, continues to yield higher Performance scores for Latino children. These consistent  $V < P$  differences could be explained as a function of socioeconomic status and language.

#### K-ABC Global Scales

The Puerto Rican children in the present sample obtained K-ABC Global Scale scores that were above the

normative means (SE:102.13; SI:104.13; MPC:103.83; NV:103.83). The most notable exception was the mean of 92.56 for the Achievement Scale, which contains subtests that are more heavily reliant on verbal skills and acquired factual information (Kamphaus & Reynolds, 1987).

These lower Achievement scores for Puerto Rican children in the present sample are consistent with scores obtained by 120 Hispanic children in the K-ABC sociocultural norming groups (92.2; Kaufman & Kaufman, 1983), and with the Achievement scores of 42 Mexican-American four and five year olders (90.60; Valencia, 1984).

Kamphaus and Reynolds (1987) suggest that these consistently lower Achievement scores exhibited by Hispanic children might "be related to their level of immersion in the "dominant school culture" (p. 159). In that same vein, Kaufman and Kaufman (1983) explain that since linguistic and cultural differences do weigh more heavily on the Achievement scale, this might account for the higher Achievement scores obtained by Whites (102.8) over Hispanics (93.6) in the standardization sample.

In addition, Kaufman and Kaufman (1983) report that the 157 Hispanic children in the K-ABC standardization sample had not only larger mean discrepancies, but more variability than Whites or Blacks for the Achievement/Simultaneous (mean discrepancy of 9.6 points) and Achievement/MPC (mean discrepancy of 11.4 points)

comparisons. The data reported by Kamphaus and Reynolds (1987) agrees with the above, however, they add the Achievement/ Nonverbal comparison (mean discrepancy of 10.7 points) as another that evidences a high mean discrepancy and variability for Hispanic samples. The same trend was exhibited by the Puerto Rican children in the present study.

#### WPPSI-R and Demographic Variables

No significant differences were obtained between the mean WPPSI-R z scores of Puerto Rican boys and girls; of children in LAU C vs. LAU D categories; or of subjects whose parents were in one of three occupational categories (service, operator/laborer, homemaker). Although these findings of no significance may have been related, in part, to the small number of subjects comprising each subgroup, they seem to be supported by previous research, and thus, provide confirmatory evidence that our sample was relatively homogeneous in terms of low SES status and English language fluency.

The finding that subject's gender was not significantly related to his or her WPPSI-R scores is consistent with findings from other studies in which sex differences did not seem to play an important role in WPPSI performance (Barclay & Yater, 1969; Woo-Sam & Zimmerman, 1973).

In regard to subject's parental occupational status, an absence of effects was also found by Kaufman (1973c) between children of semiskilled, skilled or sales/clerical men. However, Kaufman did find a significant difference in WPPSI scores between the children of unskilled laborers and those of professional men. It appears that effects are thus observed at the extreme occupational levels (or extreme SES levels), but not in the middle categories.

In our sample, none of the subject's parents fell at the extreme top occupational status (managerial/professional). A restriction of range was observed with most subjects falling in the service, operator/laborer, and homemaker categories. Finally, these results provide confirmatory evidence that our sample was truly composed of low SES subjects and that our original SES determination based on the subject's eligibility and participation in the Free-Lunch program, was accurate.

The lack of significant differences found between bilingual (LAU C) and English dominant (LAU D & E combined) children was expected based on the non-significant findings obtained between bilingual and English-dominant Mexican-American children on the WPPSI (Clark-Gerken, 1978). These findings confirm our contention that the present sample had similarly adequate levels of English-language proficiency.



### Implications

This study sought to expand the psychometric body of knowledge concerning the intellectual assessment of Latino preschoolers, particularly Puerto Rican children, by examining the concurrent validity of the WPPSI-R. Evidence from the present investigation provide support for the concurrent validity of the WPPSI-R with a sample of fluent English speaking Puerto Rican kindergarten children, using the K-ABC as the criterion measure. Not only did the WPPSI-R correlate well with the K-ABC, but there was a high degree of correspondence between the WPPSI-R and the TRAP. This suggests that the WPPSI-R (particularly the Full scale) might be a relatively accurate indicator of current academic achievement, as measured by teachers judgements of the Puerto Rican students' academic performance.

A typical pattern was observed of Puerto Rican children, where they consistently obtained higher scores on nonverbal (WPPSI-R Performance, K-ABC Sequential, Simultaneous, Nonverbal) as compared to verbal (WPPSI-R Verbal, K-ABC Achievement) measures. Since the K-ABC Achievement and WPPSI-R Verbal scores are related to a significant degree ( $r = .58$ ,  $p < .01$ ), it is plausible to suggest that the WPPSI-R Verbal scale might really be a measure of achievement or acquired knowledge. Or should the K-ABC Achievement be interpreted as a measure of verbal

intelligence rather than achievement? These questions are left unanswered and are still being debated in the literature (Kamphaus & Reynolds, 1987; Kaufman & Kaufman, 1983). However, for the present sample, the first position seems to apply better.

In any case, caution must be exercised in the interpretation of Latino children's lower verbal/achievement scores since they might really reflect various dimensions like: degree of acculturation to the dominant culture, school related accomplishments, fund of factual information and acquired knowledge, English language proficiency, and others, rather than the child's "intelligence".

Finally, the data of the current research suggest some practical implications for the assessment of Latino children. First, the need to obtain English language dominance measures prior to WPPSI-R administration is crucial and should be taken seriously. Any examiner planning to utilize the WPPSI-R with Latino children, must make sure that the youngster's English language proficiency is adequate so that cognitive abilities rather than their command of English language is reflected in the scores. Second, the WPPSI-R should only be administered to English-dominant children. If it is going to be used with bilingual children, their level of English proficiency

should be close or equal to that of their English dominant counterparts.

### Future Research

One of the greatest limitations of this study was the small number of total subjects (N=30). Future studies should include larger samples that can provide a more adequate data base on which to test the research hypotheses.

Since the process of standardization of the WPPSI-R has not yet been completed, national norms with which to compare the results of this study, were not available. This limits the study since it is imposible to know how our sample of Puerto Rican children compares to that of the nationally normed WPPSI-R. It certainly limited our ability to answer questions relative to differences between the mean WPPSI-R and K-ABC Standard scores, for example, did our children obtain higher IQ scores on the WPPSI-R or on the K-ABC? Did the Puerto Rican children exhibit similar or divergent trends in scores when compared to the national sample? These questions are important and could be addressed by future research. The WPPSI-R norms will soon be published (Fall 1989) permitting those comparisons.

Another suggestion for modification of the present study involves the inclusion of WPPSI-R Sentences and Animal Pegs subtests in the statistical analyses. In this

study they were deleted, therefore, it was not possible to determine if the lower and nonsignificant correlations obtained with the K-ABC Sequential scale were due to that deletion.

In addition to addressing the methodological weakness of this study, future studies may build upon its results. The fact that conclusive findings were obtained makes it a good candidate for replication with larger and more diverse preschool samples.

Because no study to date has examined the predictive validity of the WPPSI-R with Puerto Rican children, this type of research as an extension-study could offer important information. It would be interesting to determine if any of the WPPSI-R scales are better predictors of a student's classroom performance.

For the present study, a teacher rating scale (TRAP) to assess current classroom performance was utilized. Although teacher rating scales, in general, might be subject to problems of reliability and could be biased measures of academic performance (Partenio & Taylor, 1985), our findings suggest a strong relationship between the teacher rating scale developed by Gresham, Reschly and Carey (1987; TRAP) and the WPPSI-R. Future research could compare the WPPSI-R performance of Latino children with the TRAP and with other measures of academic performance (i.e.



standardized tests, GPA) to determine if differential levels of prediction and relationships exist.

Finally, a worthwhile future endeavor could be the development of separate WPPSI-R norms for various ethnic groups and subgroups. Those norms could help for within-group analysis, by comparing the particular ethnic minority child with his/her group. This is not an easy task, due to variations between individual children within a cultural group such as: rural vs. urban, length of residency in the U.S., language spoken at home, SES, parents educational attainment and previous academic experiences. However, it would be a step forward in helping place a child's performance in the context of his or her particular ethnic group.

The task of developing an adequate knowledge base with the WPPSI-R, particularly as it relates to minority children, has just begun. It is hoped that this dissertation research contributed to that endeavor.

## APPENDIX A

### Demographic Information on Latinos

At the present time, Latinos are the second largest ethnic group after Blacks and the largest language minority. According to the 1980 U.S. Census there are approximately 14.6 million Latinos in the United States, constituting about 6.4 percent of the total population (Congressional Research Service, 1983). However, a word of caution must be expressed when considering these demographic statistics since they might be an underestimate of the Latino population in the United States. Many Latinos remain uncouned by the Census because they are "undocumented" or have "illegal" residence in the United States.

Of the 14.6 Latinos, the largest group are Mexican Americans (8.7 million), predominately concentrated in the five Southwestern States of Arizona, California, Colorado, New Mexico and Texas. The second largest Latino group are Puerto Ricans (2.0 million), who mainly live in the Northeast, especially New York State. Cubans (0.8 million) are concentrated in the State of Florida, while other Latinos, mostly of South and Central American origin (3.1 million) are spread throughout the United States (Congressional Research Service, 1983).

Latinos represent six percent of the United States public school enrollment, however, they are 80 percent of

an estimated 3.5 million elementary and secondary school students who speak little or no English. A Latino child is not only more than twice as likely as a White child to be poor (Walton, 1987), but to be enrolled two or more years below grade level in school. Even more impressive is the data indicating that approximately 40 percent of the Latino youngsters between the ages of 18 and 24 drop-out of school as compared to 14 percent of the non-minority population (U.S. Census, 1983).

## APPENDIX B

### Parental Information Letter

Dear Parents;

Your child's school has been chosen to participate in a research project. This project will help us determine how normal children perform on some tests. We hope you will permit your child to participate in this important project.

If your child participates, he or she will be given two tests that take between 1 and 2 hours. The tests involve a variety of tasks that young children enjoy. Testing will be done at your child's school. Teachers will also complete a questionnaire describing each child's academic achievement.

At the present time, one of the tests is still being developed. We don't yet know whether a score is "high" or "low"; therefore, we will not be able to give specific feedback on the test results. All information about your child will be kept confidential; it will not be included in your child's cumulative records/files, but will only be used for research purposes. Whether or not your child participates will have no effect on his or her education. Your child will have the right to withdraw from the study at any time without penalty.

Not all children whose parents give consent will actually be tested. Once parents have given their consent, we will select the children to be tested. If your child is chosen to be tested, we will notify you in writing or in person.

We hope that you will allow your child to participate in this important project. **Please indicate your decision on the attached permission form and return it to your child's teacher as soon as possible.**

If you have any questions, don't hesitate to call me at 000-0000 during work hours. Thank you for your time and consideration.

Sincerely,

Ivonne Romero  
Project's Director  
Noname Public Schools  
Anytown St.  
Anytown, MA 00000



# APPENDIX C

## Parental Consent Form

I, \_\_\_\_\_ do \_\_\_\_\_ do not give consent to include my child,  
\_\_\_\_\_, as a participant in  
(Please print child's name)

this project. I have read the letter describing the study. I understand that my child will be tested by a qualified examiner in the child's school, that my child's teacher will be asked to complete a brief rating scale about him/her, and that my child will have the right to withdraw from the study at any time without penalty. I also understand that my child's individual results will be kept confidential, and thus, will not be included in his/her cumulative folder, but will only be used for research purposes.

I am this child's parent or legal guardian and I am completing this form on the child's behalf.

\_\_\_\_\_  
Signature of parent or legal guardian                      Date

\*\*\*\*\*  
If you give consent for your child to participate, please complete the following CONFIDENTIAL information and return it in the enclosed envelope to your child's teacher as soon as possible.

Parents' education (please check one in the appropriate column):

<u>Years of Education Completed</u>	<u>Mother or Female Guardian</u>	<u>Father or Male Guardian</u>
Less than 8th grade	_____	_____
Up to 8th grade	_____	_____
9th-11th grade	_____	_____
High school diploma or equivalent (GED)	_____	_____
1-3 years of college or technical school	_____	_____
Four years of college or more	_____	_____

APPENDIX D

Occupational Information

Mother's or female guardian's occupation (be specific):

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Father's or male guardian's occupation (be specific):

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Check the one category that best describes each parent's occupation:

	Mother or Female <u>Guardian</u>	Father or Male <u>Guardian</u>
Managerial, professional	_____	_____
Technical, sales, administrative support	_____	_____
Service	_____	_____
Farming, forestry, fishing	_____	_____
Precision production, craft, repair	_____	_____
Operator, fabricator, laborer	_____	_____
Homemaker	_____	_____
Not currently in labor force	_____	_____

Is your child bilingual? \_\_\_\_\_ Yes \_\_\_\_\_ No

What language is spoken most of the time in your home?

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## APPENDIX E

### Teacher Rating of Academic Performance (TRAP) Scale

Please rate the child's academic performance in the classroom on the following items. Use the scale provided where 5 indicates **very high performance** and 1 indicates **very low performance**.

1. Compared to other children in my classroom I would estimate the academic performance of this child as being in the:

Lowest 10% 1	Lower 30%, but not lowest 10% 2	Middle 40% 3	Upper 30%, but not highest 10% 4	Highest 10% 5
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2. In the area of reading, this child is in what range in comparison to other children in your classroom?

Lowest 10% 1	Lower 30%, but not lowest 10% 2	Middle 40% 3	Upper 30%, but not highest 10% 4	Highest 10% 5
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3. In the area of mathematics, this child is in what range in comparison to other children in your classroom?

Lowest 10% 1	Lower 30%, but not lowest 10% 2	Middle 40% 3	Upper 30%, but not highest 10% 4	Highest 10% 5
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4. In terms of grade level expectations, this child's skills in reading are:

Well below grade level 1	Slightly below grade level 2	At grade level 3	Slightly above grade level 4	Well above grade level 5
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5. In terms of grade level expectations, this child's skills in mathematics are:

Well below grade level 1	Slightly below grade level 2	At grade level 3	Slightly above grade level 4	Well above grade level 5
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